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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/963,939	09/26/2001	Songlin Zhuang	BAO TONG-101	1288

7590 06/05/2003
Robert K. Tendler, Esq.
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Boston, MA 02110

EXAMINER

CHOWDHURY, TARIFUR RASHID

ART UNIT PAPER NUMBER

2871

DATE MAILED: 06/05/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/963,939

Applicant(s)

ZHUANG ET AL.

Examiner

Tarifur R Chowdhury

Art Unit

2871

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 April 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) 8-16 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 September 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Claims 8-16 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected group, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in Paper No. 9.

Specification

2. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
4. Claims 1 and 7 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
5. Claim 1 recites the limitation "said two plates" in line 3. There is insufficient antecedent basis for this limitation in the claim.
6. Claim 7 recites the limitation "said interacting laser beams" in line 1. There is insufficient antecedent basis for this limitation in the claim.

It appears that claim 7 should be dependent on claim 6 rather than claim 1.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

8. **Claims 1, 4 and 5 are rejected under 35 U.S.C. 102(e) as being anticipated by Kralik et al., (Kralik), US 2002/0097355.**

9. Kralik discloses (page 2, paragraph 0022-0024) and shows in Fig. 1, a polarization independent optical switch, comprising:

- spaced apart transparent plates (12), the plates having conductors thereat (14);

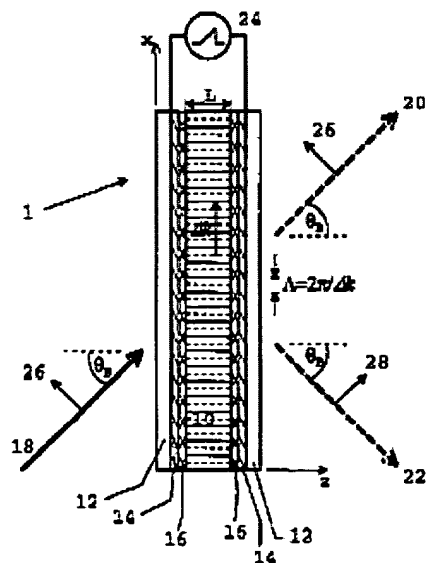


FIGURE 1

- a liquid crystal layer (10) sandwiched between the plates and having a photopolymer dispersed therein;
- a diffraction grating (10) formed within the liquid crystal layer and having a predetermined spatial frequency (Fig. 1); and
- a voltage selectively applied across the plates to erase the grating such that an impinging light beam (18) has its exit direction (22) offset in accordance with the spatial frequency ($m = +1$) of the grating so as to exit at a predetermined exit point or has its exit direction (20) unaltered by the switch such that the light beams exits at a different exit point, thus to switch the incoming beam (18) between two exit points. (Fig. 1) (page 2, paragraph 0024.

Accordingly, claim 1 is anticipated.

As to claims 4 and 5, Kralik also discloses that the impinging beam is a p-polarized optical beam (page 2, paragraph 0024) (applicant's plane polarized monochromatic light beam).

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. **Claims 2 and 3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kralik as applied to claims 1, 4 and 5 above and in view of Stole et al.,**

(Stone), "performance of photonic switching systems based on electro-optic volume holographic diffraction gratings", SPIE 41112, 38-47 (2000).

12. Kralik differs from the claimed invention because he does not explicitly disclose that the optical switch is comprised of two cells cascaded together wherein the exit point of the light beam is determined by which the cell that has voltage applied thereto and one of the cell has a diffraction grating having a spatial frequency different from the other cell and thus be able to vary the exit point.

Stone discloses an optical switch wherein the switch comprising at least two cells cascaded together and the cell that has voltage applied thereto determines the exit point of the beam. Stone also discloses that one of the cell has a diffraction grating of different spatial frequency than the other cell and thus vary the exit point associated with the diffraction grating of a cell to further control the exit point of the impinging beam (pages 41-44, Figs. 4 and 6). Stone also discloses these switches are advantageous because they exhibit very low insertion loss, have high speed, high power handling capability and low cost.

Stone is evidence that ordinary workers in the art would find a reason, suggestion or motivation to use form an optical switch using at least two cascaded cells.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify the optical switch of Kralik by cascading at least two cells together so that the cell that has voltage applied thereto determines the exit point of the beam and one of the cell has a diffraction grating of different spatial frequency than the other cell and thus vary the exit point associated with the diffraction

grating of a cell to further control the exit point of the impinging beam, so that a switch that exhibit very low insertion loss, have high speed, high power handling capability and low cost is obtained, as per the teachings of Stone.

13. Claims 6 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kralik as applied to claims 1, 4 and 5 above and in view of Tanaka et al., (Tanaka), USPAT 5,748,272.

14. Kralik differs from the claimed invention because he does not explicitly disclose that the grating are formed by two plane polarized interacting laser beams.

Tanaka discloses an optical switch wherein the gratings are formed by two plane polarized interacting laser beams (Figs. 16A-16C, COL. 16, lines 39-43). Tanaka also discloses that using of laser beams to produce gratings is economical and simple (col. 4, lines 47-50).

Tanaka is evidence that ordinary workers in the art of liquid crystal would find a reason, suggestion or motivation to use two interactive plane polarized laser beams to form gratings.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to use two interactive plane polarized laser beams to form the gratings of Kralik in an economical and simple way.

Accordingly, claims 6 and 7 would have been obvious.

Conclusion

15. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

a) US 2001/0033400 is related to switchable polymer dispersed liquid crystal optical elements.

b) US 2002/0130988 is related to a holographically-formed polymer dispersed liquid crystals.

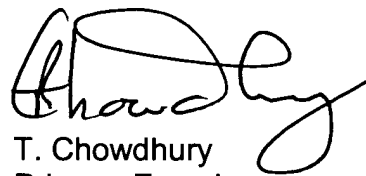
c) USPAT 6,111,633 is related to a polarization independent optical switch that selectively switches an optical signal from at least one input port to a prescribed one of a plurality of different output ports.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tarifur R Chowdhury whose telephone number is (703) 308-4115. The examiner can normally be reached on M-Th (6:30-5:00) Friday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, William L Sikes can be reached on (703) 305-4842. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 746-7005 for regular communications and (703) 308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-1782.

TRC
May 31, 2003



T. Chowdhury
Primary Examiner
Technology Center 2800